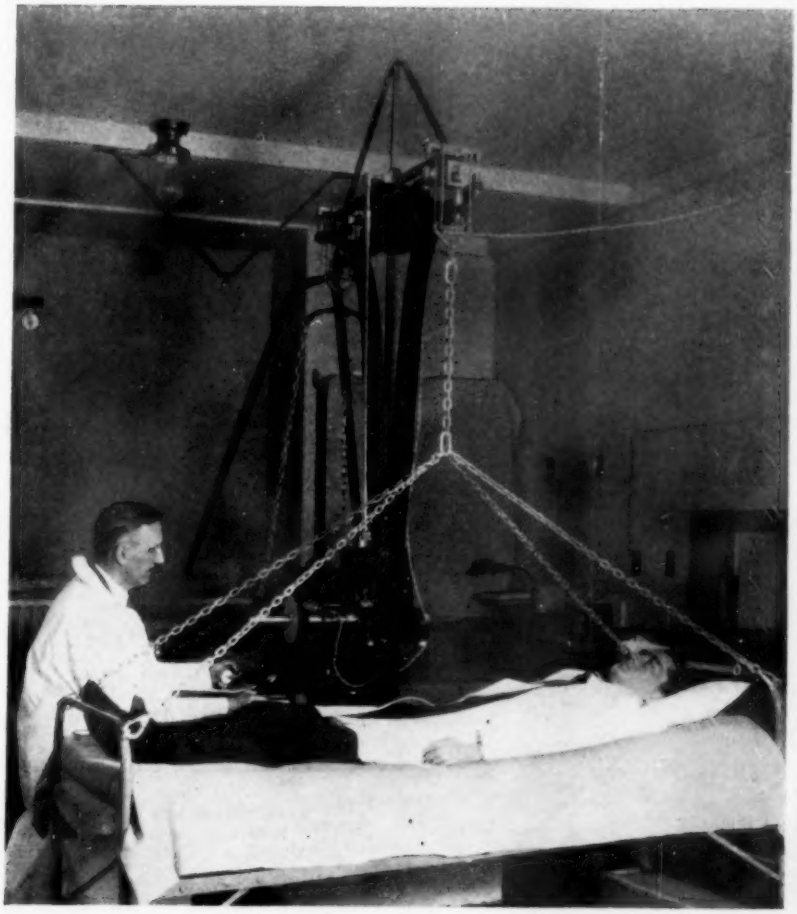
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



NOVEMBER 4, 1933

Personality by Weight

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SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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DO YOU KNOW?

The Japanese eat more fish per capita than people of any other country.

"Red water", which is sometimes observed in coastal regions is caused by microscopic organisms.

A diesel-powered barge is being operated for the first time in the grain trade on the St. Lawrence canals.

Almost twice as many cases of otosclerosis, or hereditary progressive deafness, occur in females as in males.

A safety first campaign has been started in the Civilian Conservation Camps to keep down accidents during winter weather.

A new metallic alloy called tellurium-lead is used in pipes and is said to have twice the resistance of ordinary lead pipe to bursting by frost.

Explorers in South Polar regions have found that human voices could sometimes be heard a mile and a half away, and dogs barking eight miles away.

In Puerto Rico it is customary to keep new-born babies indoors for the first 40 days.

A mushroom recently found in Muir Woods, California, measured 15¾ inches across the top, and had a stalk almost 12 inches high.

Influence of sea air on works of art, and precautions needed in transporting them overseas, were the subject of a recent international inquiry.

A canoe hollowed out of a tree trunk is a relic of old Irish navigation discovered in Ballinderry County by an expedition from Harvard University.

The thickness of the glass wall of a radio tube or electric light bulb can be measured without breaking the glass, by means of an optical thickness gage.

In one Florida county, 40,000 cans of food were put up this summer for families of the unemployed, under direction of the home demonstration agent.

WITH THE SCIENCES THIS WEEK

ANTHROPOLOGY

Why is the new *Homo kanamensis* so named? p. 294. *Man and the Vertebrates—Alfred Sherwood Romer—Univ. of Chicago*, 1933, $3.

ARCHAEOLOGY

What is the "Cross of Palenque"? p. 300. *The History of the Maya—Thomas Gann and J. Eric Thompson—Scribner's*, 1931, $2.50.

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ASTRONOMY

How many lenses has the Franklin Institute Planetarium? p. 291.

Why do the Leonid meteors appear to come from a point? p. 298. *Meteors—Charles P. Olivier—Williams & Wilkins*, 1925, $6.

ASTRONOMY—CHEMISTRY

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BACTERIOLOGY

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Why may conifers be called giants? p. 302.

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What fish are full-grown in spite of appearances? p. 297.

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Who was the first industrial physician? p. 296.

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What is a duck doing when it stands on its head in the water? p. 297.

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What are the most energetic particles ever controlled by man? p. 291. *An Outline of Atomic Physics—Physics Staff, Univ. of Pittsburgh—Wiley*, 1933, $3.50.

PHYSIOLOGY

How well do people become accustomed to smoking? p. 296.

What bedtime drink induces quiet sleep? p. 294.

PLANT PATHOLOGY

How can the further importation of Dutch elm disease be prevented? p. 297.

PSYCHOLOGY

Is there any relation between what a man eats and what is on his mind? p. 292.

SURGERY

What is the normal load on the heart? p. 296.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but are references for futher reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

PHYSICS

Particles Get Greatest Energy From Whirligig Atomic-Gun

Fragments Fly From Explosion With More Energy Than That of Deuton Bullets Which Tear Atoms Apart

ATOM smashing has revealed new secrets about the hidden energy of the building blocks of matter that may some day serve as power in a super-machine age civilization.

These new advances were disclosed by Dr. Ernest O. Lawrence, an American physicist, at the session of the Solvay International Institute of Physics being held in Brussels. Dr. Lawrence, with Drs. M. Stanley Livingston and Malcolm C. Henderson, his colleagues at the University of California, has also communicated his research results to the American journal, *The Physical Review*, to appear in a forthcoming issue.

The whirligig atom-gun invented by these modern alchemists has fired the most energetic atomic projectiles ever produced by artificial means. Dr. Lawrence and his collaborators forced the hearts or nuclei of heavy or double weight hydrogen, called deutons, to whirl about in a vacuum. Twice during each circular trip these deutons are fed more electrical energy. Finally they are stepped up to the almost unbelievable speed of 3,000,000 volts, the most energetic particles ever controlled by man.

Then these atomic bullets bombard targets of platinum, brass, wax and many other chemicals. Atomic disaster is the result of these collisions between the deuton bullets and the target atom hearts. The fragments of these atomic explosions flying out are caught and measured. These measurements tell the physicists the story of the atomic disaster.

Fragments of one kind fly out with a speed of 5,400,000 volts. As this is 2,400,000 volts more than the deuton bullet speed, small amounts of highly concentrated energy must have been released. These fragments, called protons, are the hearts of ordinary hydrogen atoms.

The companion fragment to the proton is called the neutron and has the same weight but no electrical charge. This particle also flies out with an energy of 2,400,000 volts.

The California scientists have interpreted the results of the collisions from the disintegration fragments. They conclude that the deuton bullet itself has been broken up and 4,800,000 volts of energy have been released as a result of this disaster. The deuton has to be very close to the target atom's heart before this disintegration will occur.

Very seldom do the right conditions exist for the release of this enormous amount of energy. So seldom, in fact, that Dr. Lawrence states that the best targets gave only two disintegration protons for every 10,000,000 deuton bullets bombarding the target. The process is so inefficient that it is only detected by very delicate scientific instruments and as yet cannot be thought of as a commercial source of power.

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GENTLE HEADHUNTER

Not an Indian maiden, as you might think! This photograph taken by Matthew W. Stirling, chief of the Bureau of American Ethnology, shows a headhunter—a man—in thoughtful pose. This is one of the famous Jivaro headhunters of the Amazon jungle. He takes an enemy's head right off the shoulders and makes a trophy of it. But in everyday life, these warriors wear skirts and long hair, paint their faces like girls and speak softly. Yet, they are not "sissy." It is just Jivaro custom. Mr. Stirling made friends with the headhunters and learned much about them to replace the mystery and scariness that the public associate with that dread name Jivaro.

ASTRONOMY

Second American Planetarium Opens in Philadelphia

AMERICA'S second planetarium, the first in the East, opened in Philadelphia on Wednesday afternoon, Nov. 1, as part of the astronomical section of the Benjamin Franklin Memorial and the Franklin Institute.

This device, a gift to the Franklin Institute by Samuel S. Fels, was made by the Carl Zeiss optical works, in Jena, Germany. It is an elaborate projection device, equipped with 119 lenses, by means of which images of all the naked-eye stars and planets are projected upon a sheet metal dome 65 feet in diameter.

For the audience seated below a realistic effect of the night sky is obtained, and the lecturer can change it at will. He may show the skies visible from any part of the earth at any time, and with the motions speeded so that a year goes by in as little as seven seconds.

There are 18 planetaria in operation in Europe. The first in America opened in 1930 in Chicago, and during the past summer has been a popular feature of the World's Fair.

At the formal opening of the Fels Planetarium the inventor of the device, Dr. Walter Bauersfield, was presented with the Elliott Cresson Medal of the Franklin Institute. The award was made in absentia, the recipient being represented by Franz Fieseler, an official of the Zeiss firm. Dr. Heber D. Curtis, director of the University of Michigan Observatory, was the principal speaker, and a brief demonstration of the instrument concluded the exercises.

Beginning Monday, Nov. 6, the Fels

Planetarium will be open to visitors, a total of 28 demonstrations a week being scheduled. Some of these will be especially for schools and colleges, but the public will be admitted daily from Monday to Friday, inclusive, at 11 a. m., 3:30 and 8 p. m., on Saturday at 11 a. m. 2:30, 4 and 8 p. m., and on Sunday at 2:30, 4, and 8 p. m.

Opening of other sections of the building is planned for Dec. 5. Among these will be the observatory, containing two telescopes for the use of the public, the section of railroad engineering, containing five full-size locomotives, the earliest built in 1837, the newest in 1927, and the sections of physics, chemistry and graphic arts.

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PSYCHOLOGY

Psychodietetics Suggested For Mind-Dietary Science

POPULAR tradition has for many ages recognized the close relation between what man put into his stomach and what he has in his mind.

No stenographer would think of asking her boss for a raise when he is hungry for lunch or when he is suffering from the effects of an unwise last-night's supper. Any bride knows that "the way to a man's heart is through his stomach." Any mother knows that children's quarrels are forgotten as soon as the cake is in sight.

In the hospital for mental diseases, this ancient knowledge assumes an increased importance. Diet has been found to have an extremely important effect in the treatment of mental disease. And, on the other side of the picture, certain dietary defects or deficiencies and the resulting diseases produce definite mental or nervous symptoms, which can, in turn, be corrected by dietary measures. Pernicious anemia, pellagra, sprue, nightblindness and beriberi are diseases in this category.

Dr. Martin F. Fritz of Iowa State College suggests the term "Psychodietetics," a self-explanatory name, to apply to studies of this nature.

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The quick freezing method is being applied by government scientists to ducks, chickens and other poultry, and these birds held in cold storage six months or more are said to be scarcely distinguishable from fresh-killed birds in taste and appearance.

BACTERIOLOGY

Germs' Conquests Aided By Strange Spreading Factor

Substance Isolated at Rockefeller Institute Makes Weak Germs More Damaging Than Strongly Poisonous Microbes

GERMS invading living tissue succeed in adding new territory to their conquests if they can bring about the production of a "spreading factor," and fail if this factor is not produced. Highly virulent germs fail to spread if they are not thus aided, while relatively mild-mannered disease organisms will take in a lot of territory and raise much trouble if they have the backing of the "spreading factor." The virulence, or inherent poisonousness, of a germ has no necessary connection with its ability to spread its infection.

These are among the new facts about infection and its spread that have been discovered lately at the Rockefeller Institute in New York City. What this "spreading factor" is that makes it easier for germs to invade new territory in the tissues, nobody knows as yet, though a clue to its possible chemical nature has already been turned up. But something of the way it acts has been worked out, notably by Dr. F. Duran-Reynals.

Found First in Animals

The "spreading factor" was first found in extracts of animal tissues, notably the male sex glands. Such tissue extracts, injected into the bodies of rabbits along with small quantities of bacteria, enabled the latter to spread rapidly, while inoculations with the same bacteria without the backing of the "spreading factor" extracts spread much more slowly or not at all.

Then Dr. Duran-Reynals succeeded in making extracts of germs that were able to spread rapidly without such help, and found that these extracts also were rich in the "spreading factor." They aided germs that were backward about spreading to penetrate the tissues, and even brought about the spread of infections elsewhere on the body. Furthermore, these "spreading factor" extracts obtained from germ cultures aided the spread of other germ species: they were non-specific in their action. They also aided the spread of vaccine virus, which is made of what might be called harmless germs.

One practical significance of this "spreading factor" is pointed out by Dr. Duran-Reynals. It is possible that a germ relatively harmless in itself but richly endowed with the factor might make possible the rapid spread of another germ of much more dangerous nature which would otherwise be unable to gain a foothold due to its lack of the factor.

Chemical Understanding Sought

Whatever the "spreading factor" is, it does not seem to be closely related to those noxious agents which induce the formation of the antitoxins and other "antibodies" that help to protect us from disease. It differs from them in three ways: it does not cause the generation of "anti-bodies" that act against it, it is non-specific, and it can be heated without being destroyed.

Dr. Albert Claude, also of the Rockefeller Institute, has made the initial steps toward a chemical understanding of what this "spreading factor" is. He has found that substances containing it combine with diazo-compounds, thus giving what is known to chemists as the "diazo reaction." Diazo compounds are a special chemical group characterized, among other things, by the presence of two nitrogen atoms as critical units in their structure.

May Be Diazo Compound

Furthermore, Dr. Claude found that various synthetic compounds having the diazo group in common would give quite similar results and also possessed the peculiar property of increasing tissue permeability and enhancing infection. These observations brought together, it appears possible that the "spreading factor," if not itself a diazo compound, might be similar to the members of that chemical group.

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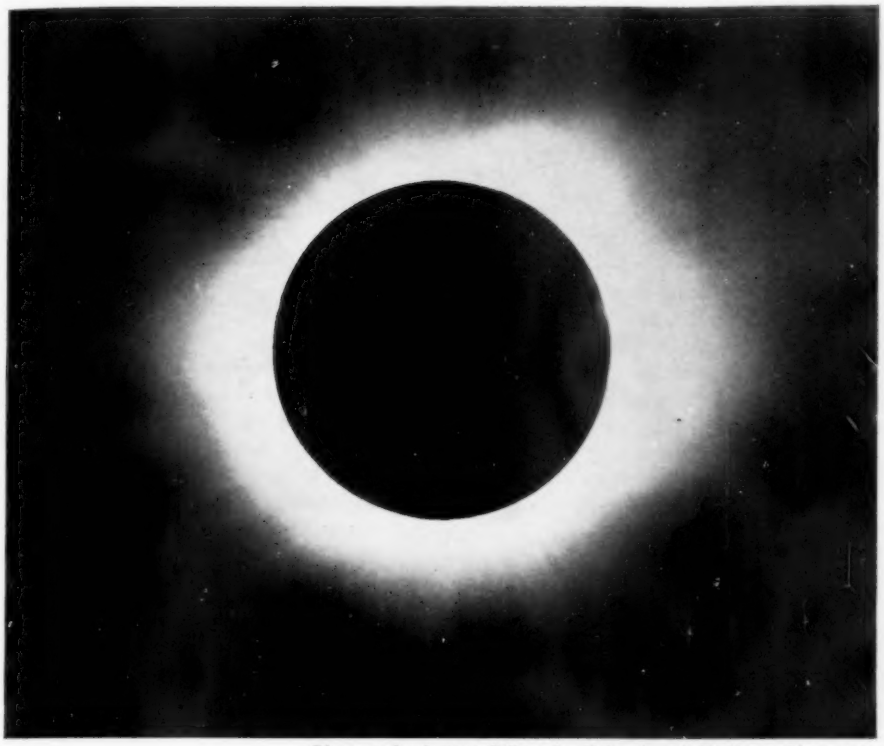
Halibut liver oil changes greatly in vitamin value with the seasons.



Photograph of 1932 Eclipse by University of Michigan Observatory

CORONIUM IS DEAD, LONG LIVE OXYGEN!

Latest astronomical researches show that coronium, the hypothetical element that scientists for over 60 years have considered the source of most of the light of sun's corona, is merely familiar oxygen in a highly excited state.

ASTRONOMY-CHEMISTRY

Mysterious Sun Element Found To be Highly Excited Oxygen

Proper Identification of Substance Called Coronium Since 1869 Accomplished by Careful Matching of Spectral Lines

THE MYSTERIOUS and hypothetical element coronium, to which for years the major part of the radiation from the sun's halo or corona has been attributed, turns out to be the common element oxygen.

In 1869 when a solar eclipse path crossed the United States green lines in the spectrum of the sun's outer envelope caused astronomers to assume an unknown element and name it after the sun's corona. The corona is visible only during the few minutes of total solar eclipse.

Now Dr. D. H. Menzel of Harvard Observatory and Dr. J. C. Boyce of the Massachusetts Institute of Technology have made the first important step in unravelling this astronomical mystery that has existed since the first observations of the coronal spectrum more than sixty years ago.

Their analysis identifies three of the five strongest coronal lines with neutral oxygen atoms in the high solar atmosphere. These atoms are in very peculiar states of excitation.

Thus the life-supporting gas in the earth's atmosphere promises to explain another of the mysteries of the heavens. For oxygen has heretofore been shown to be the cause of light from far-off nebulae and from the aurora or northern lights of the earth's atmosphere.

"The light of the gaseous nebulae was long attributed to the hypothetical element nebulium," Dr. Harlow Shapley, director of Harvard Observatory, explained in commenting on the coronium-oxygen identification. "A few years ago the nebulium mystery was solved by finding that highly ionized oxygen and nitrogen were largely responsible for the radiation. Also in recent years the mysterious light of the aurora has been assigned to oxygen."

Careful checking of the "flags" that are flown by the elements in spectrum photographs made possible this latest discovery. These "flags" are lines that appear when light is dispersed by a prism. Bright lines or bands of light, beautifully colored, are caused by the radiation given off by various chemical elements heated to incandescence. Sunlight, which forms the rainbow of a showery day or the rainbow of the physicist's spectroscope, contains a wide array of light from numerous elements. By matching the spectral lines of light from the sun, stars and other otherwise inaccessible sources with those from known elements, scientists have been able to prove the existence of various earthly substances in other parts of the universe. Helium, which is now rated as a useful and fairly available elemental gas, was discovered in the sun's chromosphere during the eclipse of 1868 as a bright yellow line. Not until 1895 was it discovered here on earth chemically.

In a similar way the hypothetical element coronium came into existence because coronal spectral lines were found that could not be linked to any known element. As more and more of the ninety-odd chemical elements were discovered and studied without being proved to be coronium, scientists began to feel confident that coronium was a common element in masquerade. Drs. Menzel and Boyce have now produced the first definite evidence.

The solution of the mystery of coronal radiation was assisted greatly by the recent discovery at Mt. Wilson Observatory that the new star Nova Ophiuchi also shows coronal lines at one stage of its explosive outburst. The investigators used corona spectrum photographs obtained at the 1932 eclipse which was successfully observed by the Harvard Observatory party.

It is probable that after this important start made by Drs. Menzel and Boyce the other coronal lines will soon be interpreted.

The Harvard Observatory announcement states that Drs. Menzel and Boyce find that the frequency difference between two coronal lines (wavelength 6374 and wavelength 3454) agrees with the difference between two known

high energy states of the neutral oxygen atom. This suggests that the lines are produced by combinations with a higher energy state. Calculation shows, the announcement states, that the oxygen atom should possess energy states of about this value. A theoretical extension of the data predicts that a line should be found at approximately the wavelength of a third prominent coronal line (wavelength 3987).

"The validity of assignment of these lines to neutral oxygen," Drs. Menzel and Boyce state, "is supported by the following facts:

"The similar appearance of the three lines on objective prism coronal spectrograms.

"The fundamental character of the states involved despite the highness of their energies.

"Their relation to the metastable states of ionized oxygen from which they may arise by electron capture.

"The production in the laboratories by Dr. Hopfield of line wavelength 6374 under conditions favorable to the excitation of oxygen metastable states.

"Opposed to the identification stands the failure of triplet lines to appear but this may possibly be attributed to the mechanism of excitation since high velocity electrons are more likely to be caught in single states."

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PHYSIOLOGY

Girls Sleep More Soundly Than Boys of Same Age

GIRLS are sounder sleepers than boys, Dr. Glenville Giddings, assistant professor of medicine at Emory University, Atlanta, has discovered. This observation was made in the course of studies to determine the effects of food and beverages on children's sleep. The girls in the group of 24 children between nine and fourteen years who were studied not only slept more quietly but went to sleep more quickly than the boys.

The results of the investigations bore out the theory that a drink of warm milk just at bedtime induces quieter sleep. This apparently is due to the facts that milk is an easily digested and assimilable food and that the temperature at which it was drunk was just about the same as the temperature of the body. The children were much more restless when they had eaten a heavy meal than when they had had a light supper.

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ANTHROPOLOGY

Pithecanthropus Had 'Modern' Contemporary, Briton Claims

DISCOVERY of a jaw belonging to an ancestor of the present-day human species was reported at a session of the Anthropological Institute in London by Dr. L. S. B. Leakey.

The discovery, if accepted according to Dr. Leakey's interpretation, would mean that human history and evolution are pushed back into a much more distant past than anthropologists have assigned to man.

Dr. Leakey, whose excavations in East Africa have been a subject of much scientific discussion, announced that the new-found jaw represents a new species, which he called *Homo kanamensis,* in honor of Kanam in East Africa where the jaw was unearthed. The evidence of a new species is based on radiological examination of the jaw. This X-ray test, it was said, showed distinguishing features in the roots of the teeth, marking an evolutionary trend towards *Homo sapiens,* the species to which all modern races of men belong.

The man represented by these skeletal remains lived in the Lower Pleistocene age, it was declared, which would give this early species an antiquity of about half a million years. He would thus be a contemporary of *Pithecanthropus erectus,* Dr. Leakey declared. *Pithecanthropus,* so-called ape-man of Java, is a far more primitive type, and has long been rated as the most venerable proto-man ever found on earth. The new discovery would imply that a much higher type of man, and a direct ancestor of the species of man that survived into modern times, lived on earth at an ancient date.

The jaw found at Kanam shows a development of chin and arrangement of teeth that are similar to *Homo sapiens,* it was reported.

Another skull from East Africa, the Kanjera skull, was declared by Dr. Leakey to be Middle Pleistocene in antiquity and to represent a generalized primitive type of *Homo sapiens.* The shape of the femur or thigh bone shows that this man walked erect, he said. Development of a culture using hand axes of stone can be traced in East Africa, Dr. Leakey said.

Commenting on the reported discovery, Dr. Ales Hrdlicka, well-known anthropologist of the Smithsonian Institution, declared that such a conclusion cannot be reached without ample evidence.

"The whole matter involves problems so great and so numerous relating to human history and evolution that a very thorough independent corroboration of the finds is called for. No opinion as to the meaning of a discovery can take the place of scientific fact.

"There is a theory gaining popularity in Europe to provide *Homo sapiens* with a long antiquity. A young German anthropologist who excavated in East Africa has already written a book on the great antiquity of *Homo sapiens.* Man is apparently about to be rescued from a history which would show his upward climb. He is to be shown as springing fully developed in mind and body into an existence beginning a half million or more years ago. It is a dismal picture, for it means that the human species has made no progress in so long a time and hence has but little, if any, prospect of making any in the future.

"So far, however, the evidence that would convince critical science on these points can hardly be said to have been furnished."

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ARCHAEOLOGY

Museum Publishes Roman House Model

A NEW IDEA in educating the public has been evolved at the University of Pennsylvania Museum. A publication just issued consists of plans, materials, and directions for assembling and furnishing in miniature a complete Roman house such as the well-to-do Pompeiians lived in before Vesuvius buried their lovely city. Instead of going to the museum to gaze at a model and wonder over the life of a Roman family, the individual can now put himself in the place of a Pompeiian home maker, taking a personal hand in the building and decorating of the home.

The new project of museum publication is the work of Mrs. Loring Dam of the Museum Staff and George B. Roberts, architect. The Museum expects the publication to be of interest not only to students and classes but also to architects. The estimated cost of the Roman house today would be about $150,000, but features of the architectural plan could be adapted to less pretentious modern construction.

The modern idea of putting a house on a pivot and turning it toward the sunlight was anticipated by the Romans, in that they provided more than one dining room, so that one would always get sunshine. The Roman house was a self-contained unit, with the activities all inside the building's walls. The garden was in a court. The "office" of the master of the house was centrally located, so that he could keep an eye on his household. So little did the exterior count in the household activities that there were shops arranged at the front and rented to merchants.

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EUGENICS

Eugenicists Approve New German Law

THE NEW German law providing for sterilization of hereditary degenerates meets with the approval of a group of eugenicists in this country, it is indicated by an editorial appearing in *Eugenical News*.

Like all laws, its use will depend upon its enforcement, it is pointed out, but the report adds, "It is difficult to see how the new German Sterilization Law could, as some have suggested, be deflected from its purely eugenical purpose, and be made an 'instrument of tyranny' for the sterilization of non-Nordic races.

"The new law is clean-cut, direct and 'model.' Its standards are social and genetical. Its application is entrusted to specialized courts and procedure. From a legal point of view nothing more could be desired.

"It is probable that the sterilization statutes of the several American states and the national sterilization statute of Germany will, in legal history, constitute a mile stone which marks the control by the most advanced nations of the world of a major aspect of controlling human reproduction, comparable in importance only with the state's legal control of marriage."

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PSYCHOLOGY

Weight Loss Found to Be Clue to Personality Type

Escape of Water From Body in Vapor on Breath and Invisible Perspiration Faster for Some Temperaments

See Front Cover

A NEW link between the mind and the body has been described to psychologists in a report by Dr. W. R. Miles and his wife, Dr. Catharine C. Miles, of the Institute of Human Relations, Yale University.

The minute quantities of weight lost from your body when you are lying quietly at rest in a room of ordinary comfortable temperature have been found to serve as an index to the sort of person you are. Individuals who lose weight rapidly under such circumstances have, in general, some different personality traits from those who lose weight slowly.

The weight loss is due to water loss from the body in vapor on the breath, which can be easily seen in cold weather but which is present at all times, and in the invisible perspiration which is constantly keeping the skin of hands and feet soft and slightly moist. The average rate of such weight loss is about an ounce and a half an hour. But one section of the experimental group of subjects lost at a rate almost twice as high as the average for the others.

The ones losing weight slowly were taller and heavier than those in the high rate group, but the fast losers were quicker in reaction time tests. The slow losers were a little more intelligent than the fast losers but, in spite of that, the educational achievements of the fast losers was greater in terms of ability.

The following personality traits were found to be characteristic of the high-loss group. They let others do the entertaining, day-dream, are self-conscious before a crowd, prefer writing to talking, tend to obey, and tend to regard themselves as slightly below average intellectually. On the other hand the following traits were found in the low-loss group. They plan but do not day-dream, get acquainted easily, seldom blush, rarely forget, tend to be cautious themselves, and consider reasons before obeying.

The cover picture shows Dr. Miles weighing a subject.

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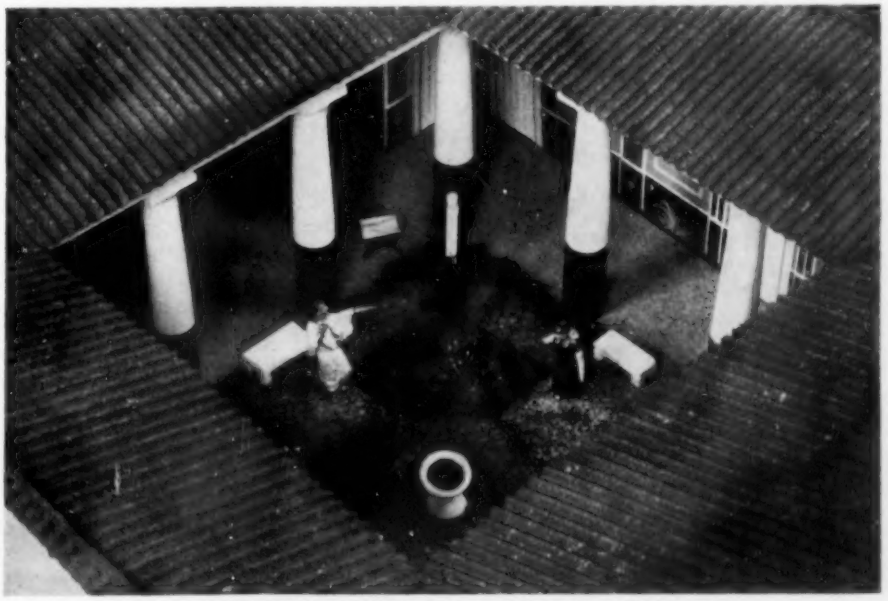

LOOKING DOWN ON A ROMAN HOME

This unusual close-up view of the miniature Roman home model reveals the garden through an opening in the roof over the court.

PHYSIOLOGY

Cigarettes Have Effect On Long-Time Smokers

HABITUAL smokers of cigarettes develop a tolerance for the drug they contain, but they still feel the effects to a certain extent, Dr. A. L. Winsor of Cornell University reported before the annual meeting of the American Psychological Association.

Your first cigarette makes a pronounced disturbance. Glands are kept from secreting in normal fashion. Muscles are so affected that you are decidedly unsteady.

Continued smoking gradually reduces the effect on the glands and lessens the marked unsteadiness. In Dr. Winsor's tests, however, it was not possible to reduce the unsteadiness beyond a certain point.

Similar tests with coffee showed that the first drink produced a considerable increase in glandular secretion, followed, when the coffee drinking continued, by a gradual reduction in this increase. Coffee had practically no effect on steadiness.

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MEDICINE

Study of Working Man's Ills Began in 1700

RIGHT NOW when so much is being done to improve the lot of the laborer comes the tercentenary of the birth of the person who first concerned himself with the working man's health.

Sunday, Nov. 5, is the three hundredth birthday of Bernardino Ramazzini, founder of industrial medicine. This Italian was a man with a social consciousness several centuries ahead of his time, writes Dr. Herman Goodman, a New York physician who recently published a compilation of Ramazzini's work, "Diseases of Tradesmen." Ramazzini's original observations were published about 1700. As recently as 1924 authors writing of industrial diseases took their descriptions from sources based on Ramazzini's work.

The divisions which he made as to two causes of dire results of occupation on the workers' health cannot be improved upon, states Dr. Goodman in a biographical note published in *Atlantica*.

"Ramazzini gives the deleterious nature of the material which the workman must handle, and the strange, improper position of the body as the two causes for ill health due to occupation," Dr. Goodman continues.

In the first cause group belong the men who worked in mines, gilders, those who rubbed mercury, worked at pottery, or with brimstone. Painter's colic and other ill effects of working with lead were known to Ramazzini.

"In the second category of causes of illness among workmen, Ramazzini devotes chapters to those who work standing up, those who sit, those who run, those who ride horseback and those who partake of sports or the activities of camp life. He explains the habitual posture of porters as being due to the distribution of the heavy weights they bear across the shoulders.

"Writer's cramp was first recognized by Ramazzini. Other chapters are devoted to the illness of midwives, nurses, vintners and brewers as well as to the special diseases of Jews and of learned men."

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SURGERY

Operating Risk Now Mathematically Calculated

A NEW yardstick of safety for the operating room was described at the Congress of Anesthetists by a British anesthetist and physician, Dr. W. Stanley Sykes of Leeds.

With this yardstick, called the energy index, surgeons and anesthetists can determine with mathematical precision the risk of operating on any patient. The exact load under which the patient's heart is working can be checked as accurately as an engineer can check on the load of a dynamo in a power plant.

The test gives in millimeters of mercury the mathematical load under which the patient's heart is laboring. The index is determined by adding the systolic and diastolic blood pressure readings and multiplying the sum by the pulse rate. As the heart's load increases or decreases from the normal of 14,400 millimeters per minute, the risk the patient runs in being operated on becomes greater. If the reading is higher than normal, it is because the heart has enlarged to take care of a greatly increased load of work. If the reading is lower than normal it is because the heart has given out entirely under the load and the energy it can expend has decreased.

Science News Letter, November 4, 1933

IN SCIE

MEDICINE

Potent Reducing Substance Found in Cancerous Tissues

DISCOVERY of a new substance in cancer tissue has been reported by Dr. Leslie J. Harris of the Nutritional Laboratory, Cambridge, England.

The significance of the discovery lies in the fact that this newly-discovered substance, called "reducytin," is what chemists designate as a reducing substance, and abnormality of reducing action is one of the most important characteristics of cancer tissues.

Dr. Harris made this discovery, just reported to *Nature*, while investigating the reducing activity of vitamin C. This reducing property of the anti-scurvy vitamin shows itself in ability to bleach a blue dye which has the long technical name of dichlorophenolindophenol. Cancer tissue, Dr. Harris found, also can rapidly bleach the blue dye. The process is one of removing oxygen or adding hydrogen atoms to the dye.

At first he thought the reducing or bleaching action of the cancer tissue might be due to the presence of vitamin C. Subsequent investigation showed that the amount of vitamin C present could only account for one-third of the reducing action of the cancer tissue. Therefore he concludes that a hitherto unrecognized and unusually powerful substance must be present.

Science News Letter, November 4, 1933

SEISMOLOGY

Interior of Bolivia Shaken by Earthquake

SHARP earthquake disturbance in the interior of Bolivia was indicated by a study of data collected telegraphically by Science Service and interpreted by seismologists of the U. S. Coast and Geodetic Survey. The quake began at 6:28.2 p. m., eastern standard time, on Wednesday, Oct. 25. Its epicenter was in approximately 22 degrees south latitude, 67 degrees west longitude. This point lies in the Bolivian state of Potosi.

Science News Letter, November 4, 1933

E FIELDS

ORNITHOLOGY

Wild Ducks Vegetarians Says Biological Survey

WHEN a duck "stands on its head" in the water, leaving only its tail and perhaps a pair of energetically kicking legs protruding, what is it after?

Food, of course. But not the bugs and frogs that most of us think of as duck food, says the U. S. Biological Survey. With the exception of the mergansers, or fish ducks, all wild ducks are at least 90 per cent. vegetarian in their food habits. The tidbits they stand on their heads for are rootstocks and tubers of aquatic plants and seeds that have sunk to the bottom. Even when a duck does a deep dive it is not after a fish, but is going to the bottom to hunt for vegetable food. The tenth of duck-food that is of animal origin consists of worms, insects, snails and crayfish—very seldom fish.

Science News Letter, November 4, 1933

PLANT PATHOLOGY

Quarantine Regulations Guard Against Elm Disease

PROTECTION for the elm-shaded streets and lawns of American cities is sought through a new quarantine regulation imposed on imported elm logs which were the means of introduction of two outbreaks of Dutch elm disease which have occurred in this country during the past three years. The regulations, which have been announced by Secretary of Agriculture Wallace, aim to permit the continued importation of these special logs, which are necessary to a part of the furniture trade, but at the same time to rid them of the risk of carrying the disease. Throughout the campaign against this new plague the Department of Agriculture has had the willing cooperation of the importers and manufacturers, it is stated.

Dutch elm disease is due to a fungus which spreads to all living parts of the tree, withers its leaves and hence kills the tree. It is carried by a species of beetle which burrows under the bark.

Hitherto all the elm logs imported for the furniture trade came in with their bark on. The key provision of the new quarantine regulations is that the bark must be removed before the logs are shipped. This practically eliminates the chance of new importations of infected beetles. A second important requirement is that the logs shall be treated with steam or hot water at a temperature of 180 degrees Fahrenheit, until they have been heated completely through for at least two hours. This will kill any fungus that may be in them.

A subsidiary provision calls for the de-barking of all elm and related lumber, in crates, etc., which may enter this country from abroad. This is to head off beetles that may be hiding in such smaller pieces.

Science News Letter, November 4, 1933

MEDICINE

Susceptibility to Colds Does Not Persist

IF YOU ARE one of those unfortunate persons who seems unusually susceptible to colds you may be cheered by the knowledge that such susceptibility does not persist year after year for an indefinite period. On the other hand, neither does resistance to colds persist indefinitely.

These seem to be among the findings of the studies on the common cold that Dr. William M. Gafafer, and Dr. James A. Doull, now of Western Reserve University, have been conducting at the Johns Hopkins University under the John J. Abel Fund for Research on the Common Cold. These latest findings have just been reported in a preliminary note to *Science*.

The frequency of attacks of colds in the same person for two successive years was studied both in medical school students and in members of a group of one hundred Baltimore families. In the medical group the frequency of attacks in the same student for two years with an interval of one year and two years in between was also studied.

A tendency for persons to remain cold-resistant or cold-susceptible at least for successive years was noted; but when the years observed are separated by one year the results are doubtful, and when the interval is two years there is no indication of a definite tendency for persons to remain in the same class as regards susceptibility or resistance to colds.

Science News Letter, November 4, 1933

ICHTHYOLOGY

Male of Deep-Sea Fish Species Never Grows Up

DR. WILLIAM Beebe, American Museum naturalist, has discovered a fish that never grows up. It is the male of a small deep-sea species known to scientists as *Idiacanthus fasciola;* it has no common English name. The females of the species are little fish, reaching a length of from 2⅓ to 10½ inches, and are normally developed. The males are much smaller, only 1¼ to 1¾ inches long, and of such generally immature appearance and structure that specimens hitherto dredged up have been judged to be not mature but "post-larval."

However, these immature-looking tiny fish contain fully developed reproductive glands, Dr. Beebe has found, and they must therefore be considered full-grown in spite of appearances. At the same time, small fishes which have hitherto borne an entirely different name have been identified by Dr. Beebe as the larval and post-larval stage of *Idiacanthus*.

Dr. Beebe's account of his discovery is given in detail in *Science*.

Science News Letter, November 4, 1933

ECOLOGY

Long Alaska Daylight Boosts Tomato Yields

CONTINUOUS daylight under actual garden conditions at Fairbanks, Alaska, did not prove a bad thing for tomato plants, as experiments under purely laboratory conditions have been interpreted to indicate, Dr. George M. Darrow of the U. S. Department of Agriculture states in a report to *Science*.

Experiments with tomato plants raised under electric light, and under a combination of electric and natural light, had obtained the best results when the illuminated and dark periods were twelve hours each in length. But tomatoes planted outdoors at Fairbanks, which is just two degrees south of the Arctic Circle and in the land of the midnight sun, grew thriftily and bore heavy crops of fruit. During June and July the sun shines an average of nearly 21 hours a day in the latitude of Fairbanks, and most of the three-hour "night" is also light enough to keep plants still at work.

Science News Letter, November 4, 1933

ASTRONOMY

Leonid Meteor Shower Should be Brilliant

Return of 33-Year Maximal Period Makes Astronomers Hopeful For Repetition of Splendors of 1833 and 1866

By JAMES STOKLEY

ONCE AGAIN, the Leonid shower of shooting stars is the main attraction on the celestial calendar for the month. Perhaps this month we shall see a display the like of which can be recalled by few now living. We may see a shower of meteors rivalling that of 1866, or even that of November, 1833, when the whole sky was thick with their flashing light. But, again, we may be disappointed, as we were in 1899. It should be pointed out right here that meteor showers do not appear with the certainty of eclipses and many other astronomical events.

No blame should be attached to the astronomer for his inability to predict them precisely. The uncertainty is inherent in the nature of the beast. Take an eclipse of the sun, for instance. We are riding around on the earth, and can observe its position among the other heavenly bodies at any part of its orbit. The moon, too, we can observe in practically all places of its path around us. The result is that its orbit, and that of the earth, can be calculated with great accuracy, and we know just when the moon is going to come between the sun and earth, producing an eclipse.

Meteors, which are commonly called shooting stars, are vastly different. They are exceedingly tiny bodies, generally no larger than a grain of sand, or at best the head of a pin. We cannot observe them until they enter the earth's atmosphere, where the friction with the air burns them in a flash, destroying them completely. It is only in their last moments of existence that we see them, but from their behavior then the astronomer assumes that others are coming along in a similar manner. From the very short path that he sees, he has to work backwards, and calculate just how they moved to get there. And when this path may extend back millions of miles, to the outer reaches of the solar system, one can readily understand some of the difficulties.

Despite all this, the astronomers who specialize in the study of meteors think there is fair chance for a fine display of shooting stars about the seventeenth of this month. These meteors revolve around the sun in a swarm which describe a huge ellipse. When closest to the sun they are about as far from that body as the earth; when most distant, as far as the planet Uranus, about 1,782,800,000 miles.

But they are not uniformly distributed around this elongated doughnut. There is one clump which contains the vast majority while relatively few are scattered around the rest of the ellipse.

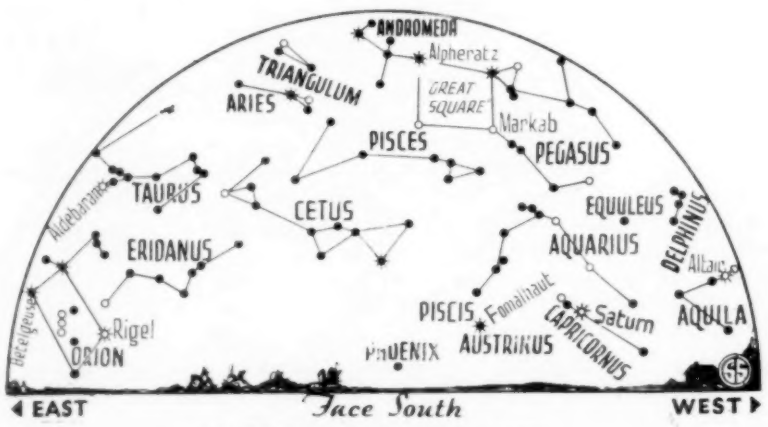
Big Shower From Main Cluster

The result is that while the earth each November crosses their path, producing a few more meteors than on other nights of the year, there is only a great shower when we hit the main cluster. And this cluster takes 33 years to travel once around.

There was a fine shower of the November shooting stars in 1799, again in 1833 and still again, though slightly inferior, in 1866, intervals of approximately 33 years. Naturally, a shower was expected in 1899, but it failed to appear, much to the disappointment of astronomers, both amateur and professional, who looked for it. Later it was shown that a few years previously the swarm had passed close to the giant planet Jupiter, which, by this gravitational attraction had pulled the swarm aside a little so that it detoured the earth. One English astronomer pointed out a few weeks before the scheduled date of the shower that this had happened, but facilities for disseminating scientific information rapidly were not as good then as they are today, and most people confidently expected the meteors.

As a result of these experiments, astronomers are properly very cautious about predicting a shower for this year, but there is some hope that we may have one. After rather feeble displays of the November meteors for a number of years, 1930 brought a fairly good one, and this was followed by a shower even more brilliant in 1931. It was supposed that this might indicate that the earth was approaching the outskirts of the swarm. Then studies of the orbit of Temple's comet, which has not been seen for many years, but which is closely associated with the November meteors, indicated that that body would make a close approach to the earth in November, 1932. This increased the probabilities for a fine shower last year, but the astronomers remained cautious in their predictions.

Finally the night of November 16 arrived, the same date as that of the little showers of the two previous years. All over the country professionals and volunteers watched the eastern sky after midnight. A nearly full moon illuminated the sky so brightly that the fainter meteors were lost in the glare. But even so, a fairly large number were seen, and, making allowance for the moon, the



SEA-CREATURES ENTHRONED

The Whale, the Fishes, the Dolphin, Aquarius the Waterman and Capricornus the Sea-Goat brighten the southern sky.

shower compared well with 1930 and 1931, even though it was nothing like 1833. From any one place where it was clear, several hundred might be observed in a few hours.

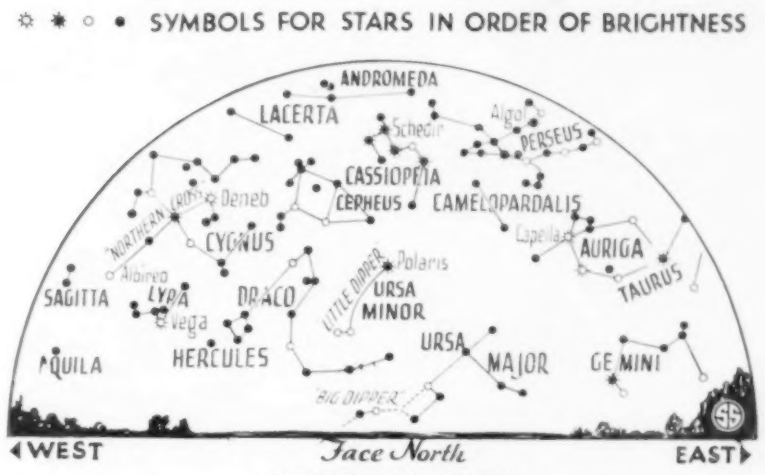
Perhaps this might seem like a small number, but it should be remembered that the meteors are not visible until they enter our atmosphere, a few hundred miles or less above the earth's surface. From any one spot, you can only observe about a hundred thousandth part of the earth's atmosphere, so if you multiply the number of meteors that you see by that figure, you will have some idea of the total number that are striking the earth.

This year the astronomers are still hoping. Fortunately, the moon is new on the crucial night, November 16, which means that the sky will be dark all night. Of course, the lights of a city can produce as much glare as the moon, so if you want to see them you had better go as far out into the country as possible. Most of the meteors are seen after midnight because then they meet the earth head-on. Those that appear in the evening sky have to catch up with it. The constellation of Leo rises in the northeast about midnight, and can be identified by the sickle, formed of its bright stars. That implement hangs with the handle pointing down and to the right, and blade to the south.

From a Point?

Look in this direction, and you will find that the meteors seem to radiate from a point in the sickle. This point is called the radiant, and because the meteors seem to come from this constellation they are called the Leonids. Actually the meteors are moving in parallel paths, which seem to converge in the distance, like railroad tracks.

Unless the shower is far more feeble than we expect, you will see them at the rate of several a minute, and occasionally you will see a brilliant "fire ball" which will be more brilliant than any star or planet, and which may leave a trail visible for several minutes. But you need have no fear that any of these will hit you. Even such a brilliant one is perhaps no larger than a golf ball when it enters the atmosphere, and it is completely burned in its passage long before it comes near the earth's surface. The usual ones are as large as a pea, and the fainter ones no bigger than a grain of sand. Sometimes meteors are much larger, and actually reach the ground, when they are called meteorites.



AN OCTET OF GLORY

Eight first magnitude stars, four in each celestial hemisphere, make the heavens brilliant in November.

But so far as we know none of the Leonids has ever come to earth.

If a really great shower does appear, rivalling those of the past, you will experience the thrill of a lifetime. Even a modest shower will be a magnificent spectacle, so everyone is advised to watch. Though the night of the sixteenth, or rather the early morning of the seventeenth is the most likely date, the uncertainty of shooting stars should be remembered. The shower may come a day or two earlier or later, so one who is really interested should watch for several nights, beginning on the fourteenth. But the astronomers are not merely interested in it as a spectacle, though they can appreciate its grandeur just as much as anyone.

If you want to aid the astronomers in their vigil, count the number of meteors you see during each half hour period, say from 12 to 12:30, 12:30 to 1, and so on. Note the time of any particularly brilliant meteor, estimating its brightness, if possible, as compared to nearby stars. If you are able, make a diagram of its path among the stars, and if it leaves a trail, note how long it persists. When you get this, send your records, together with a description of your location, amount of cloudiness, if any, and any other facts that you think relevant, to Dr. Charles P. Olivier, Flower Observatory, Upper Darby, Pa. He is the president of the American Meteor Society, and is always glad to receive reports from volunteer observers.

The stars and planet that are visible in the November evening sky are shown on the accompanying maps which show them as they appear about 10 p. m., on the first, 9 on the fifteenth and 8 on the thirtieth. High in the south is the Great Square in Pegasus, a convenient guide from which to start a study of the constellations. The northeasternmost star is the square, called Alpheratz, is in the neighboring constellation of Andromeda, which runs off from it. Just north of Andromeda is the W-shaped constellation of Cassiopeia. The Great Dipper is low in the north, under the pole star.

Eight first magnitude stars can now be seen. Directly west is Aquila, the eagle, with the brilliant Altair; and nearby, higher and to the north, is Cygnus, the swan. This is also called the Northern Cross. The Cross is now vertical, and the star Deneb is at the top. Next to Cygnus, farther north, is Lyra, with Vega to mark it. In the east appears Taurus, the bull, with the red star Aldebaran, and directly below it is magnificent Orion, now on his side. The three stars of the warrior's belt are now vertical. To the south is Rigel, to the north is Betelgeuse. North of Taurus is Auriga, with Capella. The eighth star of the first magnitude now to be seen is low in the south. This is Fomalhaut, in Piscis Austrinus, the Southern Fish.

Three Planets

The planet Saturn can be seen low in the southwest in the constellation of Capricornus. Two other planets can be seen earlier in the evening. Shortly after it gets dark, Venus is low in the southwest, more brilliant than any other planet or star. On the twenty-fifth it is at greatest eastern elongation, its position farthest to the east of the sun. Aft-

er that it will start approaching the sun again, to disappear from the evening skies in a few months.

Mars, much fainter than Venus, is still nearer the sun, but may be glimpsed in the late evening twilight. On the twentieth, Venus makes a close approach to the moon, then a slender crescent, three days past new. At 8:19 p. m., eastern standard time, Venus will be just two minutes of arc, about a fifteenth of the moon's diameter, to the south, so that it should make a most interesting sight. On the twenty-second at 2:48 p. m., eastern standard time, the moon passes almost as close to Saturn, the planet then being seven minutes north of the moon. This will happen in the afternoon, for people in the eastern part of the country, when the planet is not visible, but after dark the two will still be close together.

The moon is full on the second, at last quarter on the tenth, new on the seventeenth and at first quarter on the twenty-fourth. This will mean moonlit evenings from the first to the fourth and from about the twenty-second to the end of the month.

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FORESTRY

Warfare Ends Against White Pine Disease

PROTECTION of thousands of acres of white pine from the ravages of blister rust is one of the accomplishments of the Civilian Conservation Corps in the past few months.

Blister rust control was the major job of 35 conservation camps in northern Idaho, where vast acreages of western white pine are threatened. Seven thousand young Conservation Corps workers were distributed through the heart of the best white pine country in and adjoining the Coeur d'Alene, St. Joe, and Clearwater National Forests, working on government, state and private lands.

Control work was also done in the Lake States and in the Northeast, on national, state and private forest lands, and to some extent in portions of the national forests in Pennsylvania, Virginia, West Virginia, and Tennessee.

In the northern Idaho operations each strip covered was marked by a string line and the crews working in that section this season used 40 tons of cotton twine, laying out some 56,000 miles of line.

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ARCHAEOLOGY

Mayan History Revised By Mexican Archaeologist

Expedition to Inaccessible, Majestic Ruins of Palenque Convinces Authority There Was Only One Empire

By SR. LUIS ROSADO VEGA,

Director of the Archaeological and Historical Museum of Yucatan and Director of the Expedition of Palenque.

A RESEARCH expedition has just been completed to the remote ruins of the Maya city of Palenque, in the heart of the jungle in the State of Chiapas, Mexico. The ruins represent the most interesting and beautiful group of the very ancient Maya-Quiche civilization, perhaps the most notable on the American continent.

The expedition was organized and directed by myself, accompanied by Miguel Angel Fernandez, archaeologist of the Department of Monuments in Mexico City; Alberto Escalona, civil engineer and author of notable works on Mexican native civilizations; and the painter, Carlos Camara, who is especially interested in Mayan art.

The expedition's main object was to establish the route followed by Mayan Indians in their pioneer and colonizing migrations, and to rectify certain mistaken theories.

Palenque's ruins, whose beauty has been compared to that of the Parthenon of Greece, rise majestically at the foot of the southern Sierra Madre, a range of mountains crossing from Guatemala into the Yucatan peninsula where they disappear. The ruins offer an imposing sight in the midst of that wild scenery.

Over Forty Temples

More than forty temples are in the group of ruins, and there is the famous so-called "Cross of Palenque," subject of an extensive bibliography by archaeologists of all the world. Many opinions about Palenque and the cross are based on references or data not altogether correct, as difficult traveling in the jungle makes it uncomfortable to reach Palenque and few have visited it. Among these few are professors of Tulane University and the Carnegie Institution of Washington.

Much has been said about the "Cross of Palenque," a beautiful structure simulating a perfect cross, wonderfully carved. Some have asserted it to be a Christian cross. But after this expedition, I refuse to accept this possibility, considering it entirely superficial. It is more likely a representation of the four cardinal points, which would be logical considering that the Mayas were devoted to astronomy and were highly developed in that line.

From studies by the expedition, certain opinions heretofore considered as facts by modern archaeology are rectified. We found reason to deny the existence of a division splitting the great Maya civilization into an Old Empire and a New Empire, which supposes the archaeological groups to be, first the Old Empire in Central America, including Palenque, and later the New Empire in the Yucatan peninsula.

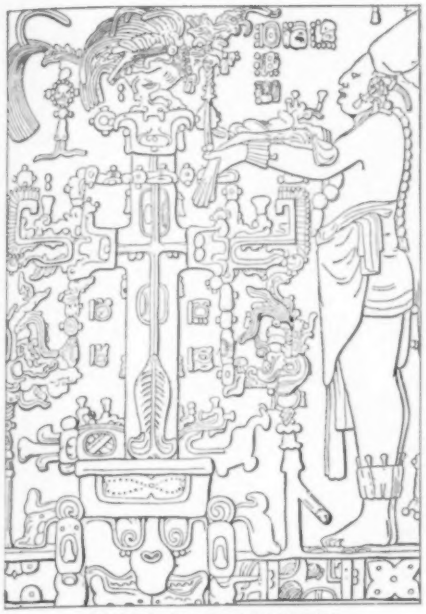
Not Older Than Yucatan

That Palenque by no means represents a period older than monuments found in Yucatan is sufficiently demonstrated by many points: the general characteristics pertaining to Mayan monuments such as pyramidal construction on terraces or truncated pyramids, the hieroglyphs entirely alike in all the groups, the shape of the ceilings, the seats placed according to astronomical calculations, and last, the perfect construction of the monuments in Palenque which is the cause of the beauty of fresco, sculpture, and carving.

What seems probable is that the Mayan tribes lived in the same period of art and civilization, not those of the north following those of the south. This does not deny that cities were built or lost at different times, but the artistic and structural rhythm is always the same.

There was only one civilization with slight differences manifested according to environment.

From Mexico City, we followed the logical route that would have been taken by the Mayan tribes from Central America to Yucatan. From a starting point called Nine Hills, the group of



CROSS OF PALENQUE

A line drawing representing a portion of the tablet of the Cross.

people who were the origin of the Mayan civilization are supposed to have left the Mexican regions and spread through Central America. They founded first the large city of Copan in Honduras and then Quirigua in Guatemala and Palenque in Chiapas and then spread to populate the banks of the great Usumacinta River until they reached Tabasco, and thence they proceeded to Campeche where they founded great communities whose ruins can be seen. Then they went on to Yucatan, leaving along their course monuments whose ruins still cause the admiration of the traveler.

This route is in perfect accord with my thesis, in the sense that there was no Old and New Empire but only different places where branches of the primitive group settled, and it is well to have in mind that not the group as a whole migrated, but colonies, so to speak, each went their own way.

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Quiet since the first few days of the month, the Caribbean celebrated the departure of October by breeding another pair of twin tropical storms, one of which passed on up the Atlantic seaboard, bringing an abnormally warm addition to Indian Summer. This pair of storms, neither of which is as severe as some of the season's earlier hurricanes, constitute numbers 19 and 20 of the 1933 family of tropical disturbances.

CHEMISTRY

New Rayon Fiber to Retain Strength Even When Wet

NEW USES for cellulose that will greatly extend its present wide industrial applications were predicted by Dr. Gustavus J. Esselen, Boston chemical enginer, in an address before the Franklin Institute.

This fundamental stuff of all plants and trees, contained in cotton, wood, cornstalks, etc., and already used in making paper, rayon, guncotton, lacquers, non-shatterable glass, transparent wrappings and a host of everyday things, will find applications that have not yet been visualized by anyone, Dr. Esselen said. He declared that a special type of rayon fiber that rivals silk in appearance and strength even when wet will soon be developed commercially. So far other characteristics of this experimental cellulose fiber have prevented its wide introduction into the textile industry.

Technical literature and patents are recording at an increasing rate new chemical derivatives of cellulose, many of which Dr. Esselen expects will appear in industry within the next five or six years. Already cellulose esters are available that have very unusual resistance to both acids and alkaline solutions, and reports are being heard with increasing frequency that new mixed esters with greatly improved properties are being developed.

There is an increasing popularity of synthetic fibers made from cellulose acetate instead of from the regenerated cellulose of which most of the "artificial silk" of commerce has been made. The cellulose acetate process for making rayon was the last of four methods to achieve commercial importance and at first its high cost deterred its wide use. Recent price reductions, Dr. Esselen explained, have allowed it to come into wider markets.

"When rayon, or artificial silk as it was then known, first began to attract attention in this country, a committee of silk manufacturers was appointed to study this new competitor and report on its possibilities," Dr. Esselen said. "After careful deliberation it finally concluded that the possibilities were distinctly limited and that it would probably be short lived.

"Yet in 1931 there was actually 60 per cent. more rayon than natural silk used in the United States and this year the proportion in favor of rayon is probably even higher. Rayon, however, should not be looked upon as a substitute for silk, but rather as unique fibers with distinct and valuable properties of their own. These fibers may be used alone in fabrics; in conjunction with cotton to furnish an attractive decorative effect; or with wool to produce pleasing new fabrics of lowered cost.

"In 1910 the production of rayon in the whole world was only about ten million pounds and none was being made in the United States. In 1931 the production here amounted to about 144,000,000 pounds.

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BOTANY

NATURE RAMBLINGS
by Frank Thone

Lowly Giants

MOST of the giants in the plant world belong to the relatively primitive plant groups.

The great forests of pine and fir and spruce, the tremendous big trees of California and the coast redwoods, hugest and oldest of living things, the hoary Tree of Tule in Mexico and its tall cypress kindred elsewhere in the world, are all members of the coniferous group, which botanists rate as evolutionally less advanced than the humble dandelions and the brief-lived sweet peas of our lawns and gardens. To the same group also belong the strange araucaria forests of South America and the cedars of Lebanon famed in the Bible, and related to it are the ginkgos cherished by the Japanese and Chinese.

Less primitive, but still in the lower ranks of the more advanced groups of flowering plants, are such trees as magnolia, tulip-tree, oak, walnut, beech, willow and chestnut. These belong to the brotherhoods of plants that include such humbler citizens as buttercups and anemones, hazelbrush and alders. It is not an exaggeration to say that the greater part of the work wood does in the world is carried on by the lower orders of plant society.

But that is not to say that all trees are members of the more primitive plant groups. There are a number that rank with the more elaborately evolved orders, as can be seen by examining their flowers, which are intricately constructed and often very beautiful. Locust and Kentucky coffee berry trees,

for example, belong to the legume family, along with smaller plants like peas, beans and clover; and this family rates fairly high among plants. Maples and box-elders are also among the more advanced of plant families, even though their flowers are not especially showy. And the gorgeous catalpas, that are ornaments of early summer woods, are away up toward the top of the plant kingdom's social register.

Botanists nowadays are inclined to rate the great group of plants that includes the grasses, lilies and their relatives as the highest of plants. This group has relatively few trees in it, yet it includes the palms, which are exceedingly important both scientifically and economically. It also includes the tree yuccas of the southwestern United States and Mexico, and the great "dragon trees" of the Canary Islands. And since some bamboos (which are grasses) get to be forty feet or more high, they might also be rated as trees.

Yet it is a notable thing that the plant family that is now rated as highest of all by botanists, the orchids, has not a single tree member. Instead, many of the orchids, especially the gorgeous tropical forms, are content to sit on the limbs of other trees, if not as parasites for food and water, at least as "hitch riders" for a place in the sun. Like all true aristocrats, they are contented to let the lower orders work for them and uphold them.

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The term horsepower was originated by James Watt to show the amount of power a horse exerted in drawing water, because Watt was trying to sell his steam engine invention to British mine owners to pump water out of mines and he wanted to explain in some vivid way what the engine would do.

First Glances at New Books

Additional Reviews On Page 304

Evolution

MAN AND THE VERTEBRATES—Alfred S. Romer—*Univ. of Chicago Press,* 427 p., $3. The author displays a most enviable mastery of all three of the major disciplines concerned in a correct understanding of evolution: phylogeny, ontogeny and comparative morphology; in this book he weaves them into a single coherent fabric with a skill that has been equalled very seldom (if indeed at all). He also takes advantage of the newest data, particularly the recent finds in human paleontology and the equally important recent revaluations of earlier discoveries. Add to that a wealth of well-chosen illustrations, and you have a book admirably fitted either for a university course on evolution or for the leisurely digestion of the solitary student.

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Biology

EVERYDAY PROBLEMS IN BIOLOGY—C. J. Pieper, W. L. Beauchamp and O. D. Frank—*Scott, Foresman,* xxxiii+ 686 p., $1.60. A textbook for ninth- and tenth-grade pupils, approaching general biological principles through the medium of everyday events.

TEACHER'S GUIDEBOOK FOR EVERYDAY PROBLEMS IN BIOLOGY—C. J. Pieper, W. L. Beauchamp and O. D. Frank—*Scott, Foresman,* 46 p., free. Preprint of part 1 only available. To accompany the foregoing.

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Entomology

INSECTS AND DISEASE OF MAN—Carroll Fox—*Blakiston,* 349 p., $4. A technical discussion which will not interest the layman but will be of great aid to physicians and health officers dealing with the diseases transmitted by insects.

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Mathematics

MATHEMATICAL FACTS AND PROCESSES PREREQUISITE TO THE STUDY OF THE CALCULUS—William Henry Fagerstrom—*Teachers College, Columbia University,* 68 p., $1.50.

Science News Letter, November 4, 1933

Psychology-Education

FOURTH CONFERENCE ON RESEARCH IN CHILD DEVELOPMENT—Committee on Child Development—*National Research Council,* free. The report includes full papers of a group of experts on child development as they were presented at the conference, and also the thought-provoking discussion which followed. The effects of modern conditions of the personality of young people were given special consideration.

Science News Letter, November 4, 1933

Archaeology

ARCHAEOLOGY AND THE BIBLE—George A. Barton—*American Sunday-School Union,* 598 p., 135 pl., $3.50. Prof. Barton's thick book on archaeology of Bible lands is now entering its sixth edition, and is revised to include recent discoveries. Written to aid Bible students and teachers, the Biblical connection of archaeological material is stressed by numerous reference to verses and events. The second half of the volume is devoted to "translations of ancient documents which confirm or illuminate the Bible." The book is excellently arranged as a reference work, and covers the subject from every angle on which the student is likely to want information.

Science News Letter, November 4, 1933

Anthropology

THE GOLD TRIBE, "FISHSKIN TARS" OF THE LOWER SUNGARI—Owen Lattimore—*American Anthropological Association,* 77 p., 80c. The tribe described in this memoir of the American Anthropological Association belongs to North Manchuria and adjoining Siberia. Not many more than a hundred families exist today, and they are being rapidly and thoroughly obliterated, Mr. Lattimore tells us, by the advance of Chinese colonization.

Science News Letter, November 4, 1933

Aviation

COMPLETE MODEL AIRCRAFT MANUAL—Edwin T. Hamilton—*Harcourt, Brace,* 578 p., $3.50. One of the most complete and elaborate books on its subject in existence; every detail of construction and finish is carefully described and illustrated.

Science News Letter, November 4, 1933

Religion

SOME FUNDAMENTALS OF A SCIENTIFIC SOCIAL ORDER—Prescott C. White—*International Press,* 31 p., 50c. The author contends that the advent of science is in reality the "Second Coming of the Christ."

Science News Letter, November 4, 1933

Social Psychology

INSTITUTIONAL BEHAVIOR — Floyd Henry Allport—*Univ. of North Carolina Press,* 526 p., $3.50. In which the author condemns the practice, ancient and modern, of setting up institutions and then personifying them—attributing to them qualities that are human, if not divine. Although we are amused today by the old fiction that when twelve men meet for joint action, there is actually a thirteenth (the group mind) present, we may be equally confused today in personifying Capital, and Labor, and Government. In the foreword, the author says, "Although this book is not science, it is the view of one who tries to understand and share the task of scientists. It should be mentioned further that these essays are a by-product of a program of research upon which I have been steadily working."

Science News Letter, November 4, 1933

Highway Engineering

PROCEEDINGS OF THE TWELFTH ANNUAL MEETING OF THE HIGHWAY RESEARCH BOARD—Edited by Roy W. Crum—*National Research Council,* Part I, 412 p., Part II, 55 p., $2.00. Part I contains the reports of research committees and the papers delivered at the 1932 meeting, while Part II is the report of the investigation by Fred Burggraf of the use of calcium chloride as a dust palliative.

Science News Letter, November 4, 1933

Radio

APPLICATIONS OF THE CATHODE RAY OSCILLOGRAPH IN RADIO RESEARCH—R. A. Watson Watt, J. F. Herd and L. H. Bainbridge-Bell—*His Majesty's Stationery Office,* 290 p., 10s. The authors, who are on the staff of Britain's Radio Research Station at Slough, are pioneers in the application of the cathode ray oscillograph to radio research. This volume explains in detail the technique underlying its use at the Radio Research Station.

Science News Letter, November 4, 1933

Biology

MEDICAL BIOLOGY—W. B. Sharp—*Author, Galveston,* 443 p., $4.50. A workbook, with condensed text discussions, covering laboratory study in bacteriology, mycology, immunology and parasitology. Adequately illustrated.

Science News Letter, November 4, 1933

First Glances at New Books

Additional Reviews On Page 303

General Science

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION 1932—*Govt. Print. Off.*, 497 p., 70c. Because of its general appendix, in which are published or reprinted more than a score of valuable summaries of current scientific progress, this annual report has provided an interesting and useful record of science year after year in addition to administrative reports. Despite its paper cover, evidently made necessary by economy, the present report maintains the standards of past years. Unfortunately, further economies in federal government allotment of funds promise to make impossible the publication of the Smithsonian Institution annual report next year, and there may be a break in this record of science which began before the Civil War.

Science News Letter, November 4, 1933

Engineering

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE—*Lincoln Electric Co.*, 434 p., $1.50. Improvements in electric arc welding during the past few years have increased the rate of world production and allowed arc welding to give greater economies than ever before. This handbook presents basic information of use to the designing engineer.

Science News Letter, November 4, 1933

Forestry

EASTERN FOREST TREE DISEASES IN RELATION TO STAND IMPROVEMENT—George H. Hepting—*Govt. Print. Off.*, 28 p. Forestry Publication No. 2 of the new series designed for the present emergency conservation work. It tells briefly but clearly about the worst and commonest tree diseases and what to do about them. There are a number of good photographic illustrations.

Science News Letter, November 4, 1933

Standards

A. S. T. M. STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS—*American Society for Testing Materials*, 292 p., $1.25.

Science News Letter, November 4, 1933

Botany

LIVERWORTS OF NORTH AND CENTRAL FLORIDA — Herman Kurz and Thomas M. Little—*Florida State College for Women, Tallahassee*, 41 p., free. An excellently done regional guide to a generally neglected subphylum of plants. The "keying out" is most carefully done, and is supported by scores of fine, clear line illustrations. This little brochure may well serve as an inspiration and a model to bryologists and hepatologists everywhere.

Science News Letter, November 4, 1933

Mathematics

SOME INFLUENCES OF THE REQUIREMENTS AND EXAMINATIONS OF THE COLLEGE ENTRANCE EXAMINATION BOARD ON MATHEMATICS IN SECONDARY SCHOOLS OF THE U. S.—Leslie Harper Whitcraft—*Teachers College, Columbia Univ.*, 115 p., $1.50. This study considers the nature and extent of the influence of the requirements and annual examinations of the College Entrance Examination Board upon the mathematics of the secondary schools of the United States. The textbook, the course of study, the curriculum, the student, the administrator, the teacher and the examination each receive consideration.

Science News Letter, November 4, 1933

Sociology

INTRODUCTION TO THE VITAL STATISTICS OF THE UNITED STATES, 1900 TO 1930—Walter F. Willcox—*Govt. Print. Off.*, 138 p., 10c. Invaluable to anyone who is concerned in any way with the growth of America's population, this pamphlet summarizes by tables, graphs and text the essential U. S. vital statistics since the turn of the century.

Science News Letter, November 4, 1933

Mathematics

CONTINUOUS GROUPS OF TRANSFORMATIONS—Luther Pfahler Eisenhart—*Princeton Univ. Press*, 301 p, $4. The Dod Professor of Mathematics in Princeton University sets forth the general theory of continuous groups of transformations, inaugurated by Lie and developed by his contemporaries. There is also included the results of recent investigations with the aid of the methods of the tensor calculus and concepts of the new differential geometry.

Science News Letter, November 4, 1933

Industrial Medicine

MEDICAL RELATIONS UNDER WORKMEN'S COMPENSATION — Bureau of Medical Economics, *American Medical Association*, 157 p., 75c. This report deals with the question of "the medical profession as a profession" in relation to the vexed subject of compensation. While it will be of interest to employers, employees, insurance companies and physicians, its chief message is for the physicians, especially the members of the local medical societies who are held to be primarily responsible for seeing that industrial medicine is practiced in accordance with the highest scientific and professional standards.

Science News Letter, November 4, 1933

Archaeology

EVIDENCE OF INDIAN OCCUPANCY IN ALBEMARLE COUNTY, VIRGINIA—David I. Bushnell—*Smithsonian Inst.*, 24 p., 11 pl. A resume of what is known of Indian history in one of Virginia's beautiful valleys, just east of the Blue Ridge. An archaeological survey of characteristic sites has been made, and the information on local Indian life and customs gained thereby is presented in the report. The plates show a large number of the artifacts and the characteristic landscape.

Science News Letter, November 4, 1933

Archaeology

PUEBLO MILLING STONES OF THE FLAGSTAFF REGION AND THEIR RELATION TO OTHERS IN THE SOUTHWEST—Katharine Bartlett—*Northern Arizona Society of Science and Art, Flagstaff*, 32 p., 60c. This "study in progressive efficiency," describes prehistoric and modern milling stones and shows the changes in this most important machine used in Pueblo households.

Science News Letter, November 4, 1933

Bibliography

BIBLIOGRAPHY OF TIME STUDY ENGINEERING OR TIME STUDY, MOTION STUDY, WAGE INCENTIVES AND FATIGUE IN INDUSTRY—Society of Industrial Engineers—*H. W. Wilson Co.*, 63 p., $1.50.

Science News Letter, November 4, 1933